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CLAIMS

1. A semiconductor photo-detecting element comprising, wherein
at least a buffer layer of the first conductivity type, a light-absorbing layer,
a field buffer layer of the first conductivity type, a multiplication layer, an etching
stopper layer, a buffer layer of the second conductivity type, and a contact layer
5 of the second conductivity type formed on a semiconductor substrate in this
order, and
a field strength applied to the etching stopper layer is lower than a field
strength applied to the multiplication layer.
2. The semiconductor photo-detecting element according to claim 1,
wherein
an impurity of the light-absorbing layer is the first conductivity type.
3. The semiconductor photo-detecting element according to claim 1,
wherein
an impurity of the light-absorbing layer is the second conductivity type.
4. The semiconductor photo-detecting element according to claim 1,
wherein
a breakdown electrical field strength of the etching stopper layer is lower
than a breakdown electrical field strength of the multiplication layer, and in that
5 the field strength applied to the etching stopper layer is lower than the
breakdown electrical field strength of the etching stopper layer.
5. The semiconductor photo-detecting element according to claim 1,
wherein

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the breakdown electrical field strength of the etching stopper layer is lower than the breakdown electrical field strength of the multiplication layer, and
5 in that the field strength applied to the multiplication layer is higher than the breakdown electrical field strength of the etching stopper layer.

6. The semiconductor photo-detecting element according to claim 1, wherein

between the multiplication layer and the etching layer there is provided a field buffer layer of the second conductivity type which relaxes the field of the
5 multiplication layer.

7. The semiconductor photo-detecting element according to claim 6, wherein

an impurity of the multiplication layer is of the first conductivity type.

8. The semiconductor photo-detecting element according to claim 6, wherein

an impurity of the multiplication layer is the second conductivity type.

9. The semiconductor photo-detecting element according to claim 1, wherein

an impurity of the multiplication layer is of the second conductivity type and has an impurity concentration of not less than $1 \times 10^{16} \text{ (cm}^{-3}\text{)}$.

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10. The semiconductor photo-detecting element according to claim 1, wherein

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the multiplication layer is a single layer in which the ratio of elements forming the multiplication layer is constant.

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11. The semiconductor photo-detecting element according to claim 10, wherein

the multiplication layer is a layer formed from InAlAs.

12. The semiconductor photo-detecting element according to claim 10, wherein

the multiplication layer has a thickness of not more than 0.3 μm .

13. The semiconductor photo-detecting element according to claim 11, wherein

the etching stopper layer is a layer formed from InP or $\text{In}_x\text{Ga}_{(1-x)}\text{As}_y\text{P}_{(1-y)}$ ($0 \leq x \leq 1.0$, $0 \leq y \leq 1.0$).

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14. The semiconductor photo-detecting element according to claim 1, wherein

the layer thickness (d_m (cm)) of the multiplication layer, the impurity concentration of the second conductivity type (N_d (cm^{-3})), and the magnitude of the electric field (ΔE_m (kV/cm)) which relaxes the field strength applied to the multiplication layer satisfy the relationship $N_d d_m \geq k \times eO \times \Delta E_m / (q \times d_m)$; (where k is the dielectric constant of the multiplication layer, eO is the permittivity in a vacuum, and q is the elementary quantity of electric discharge).

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15. The semiconductor photo-detecting element according to claim 6, wherein

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the layer thickness (d_k (cm)) of the field buffer layer of the second conductivity type, the impurity concentration of the second conductivity type
5 (N_{dk} (cm^{-3})), and the magnitude of the electric field (ΔE_k (kV/cm)) which relaxes the field strength applied to the multiplication layer satisfy the relationship $N_{dk} \geq k \times \epsilon_0 \times \Delta E_k / (q \times d_k)$;
(where k is the dielectric constant of the field buffer layer, ϵ_0 is the permittivity in a vacuum, and q is the elementary quantity of electric discharge).